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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,473	12/29/2004	Tetsuya Kamihara	040302-0427	2688

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EXAMINER

ESSEX, STEPHAN J

ART UNIT	PAPER NUMBER
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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/519,473	Applicant(s) KAMIHARA, TETSUYA	
	Examiner STEPHAN ESSEX	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-25 is/are pending in the application.
- 4a) Of the above claim(s) 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-12 and 14-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The applicant's arguments filed on June 3, 2010 was received. The finality of the Office Action dated March 3, 2010 has been withdrawn.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

3. The rejection of claims 1, 3, 6, 14-16 and 19 under 35 U.S.C. 102(b) as being anticipated by Iio et al. (hereinafter "Iio") (U.S. Pub. No. 2001/0014415A1) is maintained.

Regarding claims 1, 14 and 15, Iio teaches a fuel cell system including a fuel cell stack **1**, a hydrogen supply unit **2** (supply system), and air supply unit **3** (supply system) (see paragraph 24; figure 6). A hydrogen recirculation passage Ph**3** (recirculation system) is connected at junction BP with an exhaust hydrogen passage Ph**2** extending from the downstream side of the fuel cell stack **1** to recirculate any surplus hydrogen gas to the fuel cell stack **1** (see paragraphs 29 and 52). A second hydrogen control valve **14** (purge valve) is located in the exhaust hydrogen passage Ph**2** and is designed to have an opening degree that is controlled by a control unit **5** to purge the surplus hydrogen gas from fuel cell stack **1** and the recirculation passage Ph**3** (see paragraphs 53 and 57). The opening degree of the of the hydrogen control valve **14** is controlled by

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the control unit **5** such that the fuel cell stack **1** is purged at a desired (threshold) flow rate (see paragraphs 30, 31 and 57).

lio is silent to the controller being configured to adjust the valve opening degree of the purge valve such that a nitrogen concentration of the fuel gas in the recirculation system is controlled to be maintained at a target nitrogen concentration. However, it is the position of the examiner that control of the nitrogen concentration is inherent, given the Instant disclosure which states that when the "the hydrogen flow rate Q_{ph} discharged through the purge valve **8** is controlled to be the threshold Q_{phO} ...the nitrogen concentration C_n in the fuel recirculation system R_c can be controlled to a constant level [without using any concentration sensor]" (see paragraph 45).

Accordingly, since lio teaches maintaining a desired flow rate through a hydrogen control valve **14** by controlling the opening degree of the hydrogen control valve **14**, the fuel cell system of lio must necessarily be capable of maintaining a target nitrogen concentration. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. See *In re Robertson*, 49 USPQ2d 1949 (1999).

Regarding claims 3, 6, 16 and 19, the limitations recited therein are considered recitations of intended use. The cited prior art teaches all of the positively recited structure of the claimed apparatus. The courts have held that a statement of intended use in an apparatus claim fails to distinguish over a prior art apparatus. See *In re Sinex*, 309 F.2d 488, 492, 135 USPQ 302, 305 (CCPA 1962). The courts have held

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that apparatus claims must be distinguished from the prior art in terms of structure rather than function. Apparatus claims cover what a device is, not what a device does. See *In re Danley*, 120 USPQ 528, 531 (CCPA 1959); *Hewlett Packard Co. V. Bausch and Lomb, Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and *In re Schreiber*, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (see MPEP §§ 2114 and 2173.05(g)).

Claim Rejections - 35 USC § 103

4. The rejection of claims 4, 5, 17 and 18 under 35 U.S.C. 103(a) as being unpatentable over lio as applied to claims 1, 3, 6, 14-16 and 19 above, and further in view of Andreoli et al. (hereinafter “Andreoli”) (U.S. Pat. No. 5,605,770) and Herron (U.S. Pub. No. 2002/0022167A1) is maintained.

Regarding claim 4 and 17, lio is silent to a temperature sensor configured to detect a temperature of the fuel gas passing through the purge valve.

Andreoli teaches a temperature sensor **117** located along a main discharge manifold **20** leading from the anodic outlets of fuel cells **1, 2** to a valve **22** (purge valve) provided to discharge exhaust gases and any excess hydrogen (see col. 3, lines 19-21, 47, 51-56; figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provided a temperature sensor at the second hydrogen control valve of lio because Andreoli teaches that the temperature sensor provides a controller with information used to control the fuel cell system, including a purge valve (see col. 3, lines 49-50 and 57-58).

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Regarding claim 5 and 18, lio is silent to a pressure configured to detect a pressure of the fuel gas in the supply system.

Andreoli teaches a pressure sensor **14** located along the primary manifold **13** (supply system) which supplies fuel to the anodes of fuel cells **1, 2** (see col. 3, lines 36-40 and 46-50; figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provided a pressure sensor in the hydrogen supply unit of lio because Andreoli teaches that the pressure sensor provides a controller with information used to control the fuel cell system, including the purge valve (see col. 3, lines 49-50 and 57-58).

5. The rejection of claims 7 and 20 under 35 U.S.C. 103(a) as being unpatentable over lio as applied to claims 1, 3, 6, 14-16 and 19 above, and further in view of Epp et al. (hereinafter "Epp") (U.S. Pat. No. 6,063,515) is maintained.

Regarding claims 7 and 20, lio is silent to an ejector and a pressure sensor configured to detect a supply pressure of fuel gas supplied to the ejector.

Epp teaches a fuel cell electric power generation system wherein a pressure sensor **363** is disposed upstream of a fuel knock-out drum **326** (ejector), the fuel knock-out drum receiving fluid streams from a fuel recirculation loop **322** and a hydrogen fuel stream **317**. The rate of supply of process fluid to a vaporizer which feeds fuel stream **317** is adjusted responsive to an output of the pressure sensor **363** (see col. 6, lines 44-48; col. 10, lines 29-39; figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a pressure sensor and

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ejector along the hydrogen gas supply path of lio because Epp teaches that the knock-out drum supplies water for the humidifier and the pressure sensors allows the pressure of the supplied fuel gas to be controlled (see col. 10, lines 33-34 and 59-61).

6. The rejection of claims 8 and 21, are rejected under 35 U.S.C. 103(a) as being unpatentable over lio and Epp as applied to claims 7 and 20 above, and further in view of Andreoli is maintained.

Regarding claims 8 and 21, lio and Epp are silent to a temperature sensor configured to detect a temperature of fuel gas upstream of the ejector.

Andreoli teaches a temperature sensor **17** located along supply line **11** (supply system) which supplies fuel to the anodes of the fuel cells **1, 2**. Andreoli teaches that the temperature sensor **11** is located upstream of a control valve **12**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a temperature sensor upstream of the flow control valve on the hydrogen supply path of lio because Andreoli teaches that the temperature sensor provides a controller with the information used to control the fuel cell system (see col. 3, lines 49-50 and 57-58).

7. The rejection of claims 9 and 22 under 35 U.S.C. 103(a) as being unpatentable over lio as applied to claims 1, 3, 6, 14-16 and 19 above and further in view of Nakao (JP2002-151116; see English machine-translation) is maintained.

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Regarding claims 9 and 22, lio teaches a control valve **8** (fuel pressure regulator) that regulates the flow of hydrogen gas to be supplied to the fuel cell stack **1** (see paragraph 26; figure 6).

lio is silent to a pressure sensor provided upstream of the fuel pressure regulator.

Nakao teaches a regulator valve **2** (fuel pressure regulator) which adjusts the pressure of the hydrogen gas from the stored fuel storage cylinder **1** (supply system) and a pressure sensor **5** which detects the pressure of the hydrogen gas supplied to a fuel cell stack **6** (see paragraph 25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a pressure sensor upstream of the control valve of lio as taught by Nakao because it allows for the detection and prevention of an excessive pressure build-up at the valve.

lio is silent to a valve opening sensor.

However, it is the position of the examiner that a valve opening sensor is inherent, given that the control unit **5** must be able to determine the opening degree of the valves when adjusting them. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. See *In re Robertson*, 49 USPQ2d 1949 (1999).

8. The rejection of claims 10 and 23 under 35 U.S.C. 103(a) as being unpatentable over lio and Nakao as applied to claims 9 and 22 above, and further in view of Andreoli is maintained.

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Regarding claims 10 and 23, lio and Epp are silent to a temperature sensor configured to detect a temperature of fuel gas upstream of the fuel pressure regulator.

Andreoli teaches a temperature sensor **17** located along supply line **11** (supply system) which supplies fuel to the anodes of the fuel cells **1, 2**. Andreoli teaches that the temperature sensor **11** is located upstream of a control valve **12** (fuel pressure regulator). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a temperature sensor upstream of the flow control valve on the hydrogen supply path of lio because Andreoli teaches that the temperature sensor provides a controller with the information used to control the fuel cell system (see col. 3, lines 49-50 and 57-58).

9. The rejection of claims 11, 12, 24 and 25 under 35 U.S.C. 103(a) as being unpatentable over lio as applied to claims 1, 3, 6, 14-16 and 19 above, and further in view of Fuglevand et al. (hereinafter "Fuglevand") (U.S. Pat. No. 6,096,449) is maintained.

Regarding claims 11, 12, 24 and 25, lio is silent to an ammeter.

Fuglevand teaches a controller **122** which upon sensing, by way of current sensor **128** (ammeter), a given current output of a fuel cell **10**, adjusts a valve **104** into a predetermined fluid metering relationship relative to the supply of fuel gas **105** (see col. 7, lines 50-55; figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a current sensor in the fuel cell

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systems of lio because Fuglevand teaches the use of a current sensor to maintain the effectiveness of the fuel cell.

Response to Arguments

10. Applicant's arguments filed June 3, 2010 have been fully considered but they are not persuasive.

Applicant's principle arguments are as follows:

A) *The device of lio does not provide "a fuel gas passing through the purge valve," as recited in claim 1, because the device of lio instead passes surplus hydrogen gas through the second hydrogen control valve 14.*

B) *One of ordinary skill in the art would understand that "fuel gas," as recited in claim 14, is not simply hydrogen gas, but includes additional gases or chemical species.*

11. In response to Applicant's arguments, please consider the following comments:

A) While the fuel cell of lio is supplied with pure hydrogen gas, the surplus hydrogen gas that is contained within the hydrogen recirculation passage is hydrogen gas that has passed through anode sides of the electrolyte membranes of the fuel cell stack and may, by way of diffusion, contain small amounts of any of the gases which comprise the pure air (i.e. nitrogen, oxygen, argon, carbon dioxide, etc.) that is supplied to the cathode sides of the electrolyte membranes of the fuel cell stack.

B) Page 14, lines 22-23 of Applicant's specification disclose that "the fuel gas to be used in the system is not limited to the hydrogen gas supplied from the fuel tank 2, but may be one generated by a reformer." This implies that the fuel gas is in fact hydrogen. The only other gas or chemical species disclosed is nitrogen, which is not supplied with the fuel gas, but is rather diffused into the fuel gas from the oxidant gas through the polymer electrolyte membrane.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHAN ESSEX whose telephone number is (571) 270-7866. The examiner can normally be reached on Monday - Friday, 7:30-5:00 EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SJE

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795